

## Four Corners Air Quality Group Handout on Four Corners area current studies

Aug 20, 2008

### Ozone Studies

- Ozone Precursors Emissions Inventory for San Juan and Rio Arriba Counties, New Mexico prepared for NMED by Environ (2006), [http://www.nmenv.state.nm.us/aqb/projects/San\\_Juan\\_Ozone/NM\\_Area\\_Emissions\\_report.pdf](http://www.nmenv.state.nm.us/aqb/projects/San_Juan_Ozone/NM_Area_Emissions_report.pdf), [http://www.nmenv.state.nm.us/aqb/projects/San\\_Juan\\_Ozone/Errata\\_SanJuanRioArribaEI\\_0107.pdf](http://www.nmenv.state.nm.us/aqb/projects/San_Juan_Ozone/Errata_SanJuanRioArribaEI_0107.pdf)
- Mesa Verde National Park NPS Ozone monitor (conditions and trends tracked at <http://www.nature.nps.gov/air/Monitoring/O3Plots/index.cfm>)
- Colorado State University is studying Ozone impacts from oil and gas development quantifying the peak ozone impacts from oil and gas emissions in the western U.S., with a focus on Mesa Verde. A short paper has been written: <http://www.cira.colostate.edu/publications/newsletter/spring2008.pdf>
- Passive ozone study completed in Aug-Sept 2007 in SW Colorado.
- Passive ozone study completed in San Juan County, New Mexico in 2004 and 2005 (with results used for locating the Navajo Lake monitor).

### Volatile Organic Compound (VOC) Studies

- Environ has estimated VOC speciation profiles for certain oil and gas emissions sources (including drill rigs, compressor engines, heaters, venting & flaring, and others) for the Four Corners Modeling Project

### Mercury Studies

- Mountain Studies Institute San Juan Mountains Mercury Studies:
  - Organizing Mercury Advisory Committee to be a Four Corners Mercury forum
  - Study of methyl mercury in small lake zooplankton
  - Study of Mercury in Lake Sediment Cores
  - Bulk deposition collector at Molas Pass operating since April 2007, and snowpack studies
  - Planned 2009-2010 study of Ecological effects and sources of Mercury deposition at Mesa Verde
- EPA 9 has mobile mercury monitoring capability.
- Mercury Fingerprinting Study (University of Michigan study - in process), NM provided coal samples from San Juan Generating Station and Four Corners Power Plant.
- San Juan Public Lands BLM CO Molas Pass NADP Network site. BLM has secured funds for the monitor at Molas Pass, and it will be installed in 2008/2009.
- Mesa Verde NPS Mercury Deposition Network (MDN) monitor. NADP-MDN website (<http://nadp.sws.uiuc.edu/mdn/>) includes temporal trend graph for mercury. Total Hg is wet deposition has been monitored at Mesa Verde NP since 2002.
- US Geological Survey (USGS) has measured Hg concentrations in snow pack at a few sites in the San Juan Mountains.
- San Juan Generating Station is studying the effects of using emissions control (baghouse and different types of activated carbon injection) on mercury emissions.
- Pine River Watershed Group has studied Mercury in the Upper Pine River Watershed and Vallecito Reservoir in SW Colorado. The group measures mercury in precipitation at the Vallecito Reservoir.
- Dr. Richard Grossman has studied the concentration of Hg in human hair in Four Corners area.

### Other Deposition Studies (N, S, H+)

- USFS has funded Nitrate Deposition studies and conducted monitoring over past 15 years (Ongoing long term commitment for USFS)
  - Full analysis of existing Wilderness Lakes data, including spatial and temporal trends and correlation of measurements with watershed and lake characteristics, completed by USFS up to 2004
  - High Lake Deposition Studies, NADP Program; Research results in: Musselman, R.C. and W. L. Slauson, 2004. Water chemistry of high elevation lakes in Colorado. Biogeochemistry 71:387-414. Also see: NADP 2006 Summary at <http://nadp.sws.uiuc.edu/lib/data/2006as.pdf>
- Mesa Verde NPS
  - National Atmospheric Deposition Program (NADP) monitor (NPS Air Resources Division's Government Performance and Results Act (GPRA) track conditions and trends.) <http://www.nature.nps.gov/air/who/npsPerfMeasures.cfm>

- In Progress: Modeling simulations (CAMx) for total dry deposition in all parks including Mesa Verde. CASTNet only measures nitric acid, PM ammonium and PM nitrate. Modeling will estimate NH<sub>3</sub>, NO<sub>3</sub> radical and organic nitrates to get a total dry deposition. (estimated completion fall, 2008)
- Some research work done by Mountain Studies Institute and San Juan Public Lands Center for SW Colorado.
- Some trends research work done by Dr. Winn Wright and the Pine River Watershed Group (Vallecito Reservoir)

#### Ammonia Studies

- Passive ammonia study completed by EPA R6 in 2006/07 and 2008. Mark Sather has a paper undergoing peer review now and another phase is ongoing.

#### Multiple Pollutant / Other Studies

- Chronic Respiratory Study (NM Health Dept, "The Association between Ambient Air Quality Ozone levels and Medical Visits for San Juan County (2007) <http://www.nmenv.state.nm.us/aqb/4C/Documents/SanJuanAsthmaDocBW.pdf>
- Independent Petroleum Association of Mountain States (IPAMS) O&G emissions inventory study covers the San Juan Basin
- Four Corners Aerometric and Hydrometric Monitoring Networks. GIS Mapping, Data Access and Analysis (DOE/Argonne) (on the 4CAQTF website)
- Modeling analysis for proposed Desert Rock power plant  
([http://vista.cira.colostate.edu/improve/Publications/GrayLit/020\\_DesertRockSimulations/DesertRock\\_Mcarlo.pdf](http://vista.cira.colostate.edu/improve/Publications/GrayLit/020_DesertRockSimulations/DesertRock_Mcarlo.pdf)  
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